

Eyck by the deposition of copper electrically upon the clay model. The production of bronzes may be readily carried out on a small scale by the following process communicated to the *Natural History Journal*, and which possesses some elements of novelty. Take any plaster figure or group, boil in sterine, then blacklead and plunge in a copper bath. Attach a very weak battery, and deposit very slowly a *thin* coating of copper. Now remove from the bath, and bake in an oven until the plaster model shakes out in dust. You have now a very thin copper reproduction of your model. Varnish this outside so as to prevent the further deposition, and replace in the bath. The copper will now be deposited on the inside surface, and you can thicken up to any desired point. For this second process a much stronger battery may be used.

MM. LECLERC and Vincent have described to the Physical Society of Paris an electrical instrument which will automatically record the notes played upon a piano. It can be adapted to a piano of any construction.

CLÖE's thermoelectric pile has been recently improved by an addition which obviates the injurious effect of sudden and excessive heating of the junctions arising from alteration in the pressure of the gas. This safety-apparatus consists of a small glass vessel about half filled with water, and closed by a cork stopper, through which pass two tubes, one going to the bottom and being a branch of the tube by which the gas comes to the pile, while the other is shorter, and conducts any gas that may pass through it from the vessel to a gas-burner on another branch constantly lit. If the pressure of the gas is weak the water closes the mouth of the longer tube; if it increases the gas issues in bubbles in the liquid and rises through the shorter tube to the gas jet, where it is lit. The arrangement is a sort of safety valve, and prevents the pressure from exceeding a certain amount, which is regulated at will.

M. MARCEL DEPREZ has devised an ingenious apparatus for transmitting a movement of rotation by electricity. The apparatus is composed of a transmitter and a receiver. The transmitter consists of two ordinary split-collar commutators set upon a common axis, but adjusted at right angles to each other. The receiver consists of two longitudinal armatures carrying coils of wire as employed in the earlier Siemens' magneto-electric machines. These also run on a common axis and in positions at right angles to one another: and they are placed in the magnetic field between the poles of a permanent magnet. Currents generated by a battery pass through the transmitter and are conveyed by wires to the receiver. For every position of the axis of the transmitter there is one position—and one only—of stable equilibrium for the axis of the receiver. Hence the axis of the receiver follows all the movements of the transmitter; turns at the same rate and in the same direction as the transmitter may be turned; and makes the same number of revolutions precisely to within a quarter of a revolution.

GEOGRAPHICAL NOTES

THE new number of the Geographical Society's *Proceedings* is chiefly occupied with a narrative of Lieut. G. T. Temple's voyage on the coasts of Norway and Lapland, illustrated by a map on which the depths of the ocean are well shown in colour, and by Mr. E. Hutchinson's account of Mr. Ashcroft's ascent of the River Binué last August, with remarks on the systems of the Rivers Shary and Binué. With the latter paper is given a reduction of Mr. Flegel's map of the Upper Binué from his own surveys, recently issued by Hellfarth of Gotha. An interesting letter from Mr. Thomson is afterwards given, furnishing information as to the progress of the East African Expedition. Among the geographical notes may be mentioned a summary of the most recent rumours respecting Prejevalsky and a description of routes from Dzungaria into Tibet. There is also an account of a visit paid by Mr. Woolley, of the Consular service, to the Island of Tsushima and Corea, and of the Rev. J. Chalmers's recent explorations in the interior of New Guinea, in the course of which he traversed a considerable extent of previously unknown country. The notes are followed by a communication on the "Tal-Chotiali Route from India to Pishin and Candahar," furnished by Mr. G. W. Vyse, who was attached to the Tal-Chotiali Field Force, in correction of previous statements made respecting this route.

By a note received on April 28 we learn that the Howgate Arctic Expedition Bill passed the House of Representatives at

Washington on the 15th inst., and has gone to the Senate for final action. "This is a great step in advance, and augurs well for Government aid to the Expedition."

UNDER the title of "*La Exploradora*" an association has been formed in Spain, through the instrumentality of Señor Don Manuel Iradier, for the exploration and civilisation of Central Africa, and in furtherance of its objects commenced the publication of a *Boletín* in March. This association proposes to despatch an expedition from the west coast with what appears to be a somewhat ambitious programme. Its starting-point would be the Bay of Corisco, whence it would traverse the Sierra de Cristal, and afterwards march by way of Mount Onschiko and the River Eyo towards Lake Albert. If successful so far, it would then visit Mount Gambaragara, in the Usongora range, to study the peculiar population said to be found there. Then, turning in a north-westerly direction, it would make its way back to the Gulf of Guinea by Lake Liba and the Cameroons River. It is proposed that this expedition should start at latest during the month of June, but we are not aware whether the necessary funds for its journey of fourteen months have been provided. In the course of their march it is intended that the members of this expedition should devote themselves to the study of all the important problems yet unsolved in the central region of the African continent, and especially whether there be any connection between Lake Liba and the rivers Shary and Binué.

It is stated that the Comte de Semellé is about to return to Africa, in order to undertake an exploring expedition up the river Binué.

DR. REGEL, director of the Imperial Botanical Garden of St Petersburg, gave an account of the Flora of Turkestan at a recent meeting of the St. Petersburg Horticultural Society. Turkestan may be divided into two distinct parts—the west, with a very mild climate, and the east, the climate of which is almost that of St. Petersburg. The flora of Turkestan is exceedingly varied, much resembling that of Central Asia; plants proper to the climate of Europe grow there in small numbers. The eastern part abounds in Alpine specimens, and in general its vegetation approaches that of Europe, although quite as often plants are met with which are the sole product of Central Asia. Turkestan possesses neither lily nor tulip, and has very few conifers.

LAST week we referred to Mr. E. Whymper's mountaineering exploits in South America. Some further details are given by Mr. Whymper himself in a letter to Mr. F. F. Tuckett in Tuesday's *Times*. It is dated from Quito, March 18. He says:—"You will be glad to hear that I have succeeded in polishing off Chimborazo, Corazon, Sincholagna, and Antisana. We have also passed twenty-six consecutive hours on the top of Cotopaxi. This last I reckon a feat, and I am not aware that any one has ever before encamped at so great an altitude as 19,500 feet. Antisana is the most difficult of those we have been up, and few more difficult ascents have ever been made. We are now going off to Cayambe, the mountain on the Equator, and shall try on the same journey to polish off Saranen and Cotocachi. Cayambe is thought to be an active volcano, but it is not certain that this is the case, neither is its height well determined. The height of Saranen is not known, but it is high. Cotocachi is the volcano which destroyed Ibarra some years ago, and is reputed to be 16,300 feet high. We have grown out of being affected by rarefaction of the air, and can be quite gay and lively at 19,000 feet. At first I was fairly knocked over by it, and was rendered quite incapable. The Carrels also were nearly as bad. The climate of Ecuador is the most utterly abominable that can be imagined. We have not had one single day fine from beginning to end, and not one view from a mountain top. An hour of clear weather from 6 to 7 a.m. is the most you can reckon on, and after that everything is bottled up in a mist. We carry about mercurial barometers everywhere, and boil water to an extent that would delight your heart."

IN the May number of their *Chronicle* the London Missionary Society announce the departure, on April 16, of a new expedition for East Central Africa, to reinforce the weakened and scattered party now there. The Rev. A. J. Wookey goes to join Mr. Hore at Ujiji, the Rev. D. Williams to Urambo, where Dr. Southon now is, and Mr. W. S. Palmer, a medical missionary, to Ughu, where, we presume, he will be stationed at Mtowa, near the Lukuga Creek.

IN their just-issued eighty-eighth Report the Committee of the Baptist Missionary Society summarise the efforts of their

Congo Expedition to reach Stanley Pool by way of San Salvador and Makuta. Owing to tribal jealousies, the Makuta route has had to be given up, but fresh efforts are now being made to discover some other route to the Upper Congo by Zombo or Sanda; or should these prove unfavourable, to strike out an altogether new road, and so to reach Stanley Pool over hitherto untrodden ground. By latest advices it seems probable that they may be able to get there by Sanda (about two days' journey from Makuta), where Messrs. Comber and Crudgington have been well received, and have been allowed to establish a station.

A "THÜRINGER WALD" Club, similar to the various Alpine clubs, has recently been formed at Eisenach. An "Erzgebirge" Club is in course of formation at Joachimsthal (Bohemia). A Saxon Club for the closer investigation of the last named mountain chain has existed for several years; also a "Rhongebirge" Club. These clubs do great service to tourists and the general public, and would be well worth imitating in our own mountain districts.

MR. STANFORD has issued three nicely-printed maps in which the results of the recent elections are very clearly shown for England, Scotland, and Ireland. The maps have been designed by Miss E. Shaw-Lefevre.

MR. STANFORD has just published a "Geography for Little Children," by Mrs. Zimmern, which in a very simple and interesting way attempts to show the use of a map and teach some of the elementary points of physical geography. Its numerous attractive and quite original illustrations are an important feature. We have also received the forty-fifth edition of Cornwell's "Geography for Beginners."

SCIENTIFIC SERIALS

THE *Journal of Anatomy and Physiology, Normal and Pathological*, vol. xiv. Part 3, April.—Prof. Turner, the structure of the comb-like branchial appendages, and of the teeth of the basking shark (*Selache maxima*) (with a plate).—Dr. G. Thin, on the ganglion-cells of the elephant's retina.—Dr. J. H. Scott, on the structure of the style in the tongue of the dog.—Dr. A. H. Young, on the anatomy of the Indian elephant.—Dr. C. Creighton, illustrations of the pathology of sarcoma, from cases of subcutaneous cystic tumours (three plates).—Dr. Dreschfeld, on a peculiar form of liver tumour (with a plate).—On a case of cerebellar tumour (with a plate).—Dr. T. Oliver, post-mortem in a case of extreme obesity.—Prof. J. Young, on the head of the lobster (with a plate).—W. S. Richmond, new abnormalities of the arteries of the upper extremity, with a plate.—Dr. R. J. Anderson, abnormal arrangement of the thyroid arteries (with a plate).—On a variety of the mylo-pharyngeus and other unusual muscular abnormalities.—Drs. P. M'Bride and A. Bruce, the pathology of a case of fatal ear-disease (with a plate).—Dr. F. Shepherd, notes on the dissection of a case of congenital dislocation of the head of the femur.—J. D. Brown, abnormal cystic artery.—Anatomical notes.

Journal of the Royal Microscopical Society, vol. iii. No. 2, April, 1880.—A. D. Michael, a further contribution to the knowledge of British Oribatidæ, Part 2, with the assistance of C. F. George (two plates).—Dr. Lionel S. Beale, annual address as president.—J. W. Groves, on a means of obviating the reflection from the inside of the body tubes of microscopes, with suggestions for standard gauges for the same and for sub-stage fittings.—A. Nachet, on a petrographical microscope.—The record of current researches relating to invertebrata, cryptogamia, microscopy, and bibliography.—Proceedings of the Society.

Revue Internationale des Sciences, April.—M. Gilkinet, on the development of the vegetable kingdom in geological times.—A. de Bary, on apogamous fungi, and on apogamy in general.—R. Blanchard, on striated muscles in the monomyary acephalous mollusks, and on the peritoneum of Seba's python.

THE *American Naturalist*, vol. xiv., No. 3, March.—G. Macloskie, the proboscis of the house-fly.—E. Coues, sketch of progress in mammalogy in the United States in 1879.—E. D. Cope, a review of the modern doctrine of evolution, being an abstract of a lecture delivered before the Californian Academy of Sciences (with several cuts of crania of Anura).—E. A. Smith, a paper concerning amber.—Notes on recent literature, General Notes, and Scientific News.

No. 4, April.—W. S. Barnard, protoplasmic dynamics (an

attempt to find a clue "to the mode in which molecular movement is transformed into the movement of masses").—C. S. Minot, a sketch of comparative embryology (II., the fertilisation of the ovum).—C. A. White, on the progress of invertebrate paleontology in the United States for the year 1879.—E. D. Cope, a review of the modern doctrine of evolution (concluded).—A. J. Cook, on the tongue of the honey-bee.—Notes on recent literature, General Notes, Proceedings of Scientific Societies.

Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, vol. xxix. Part ii., June to December, 1879, Vienna, 1880, contains, besides list of members and minutes of the Proceedings, the following memoirs:—Otto Bohatsch, supplement to the lepidopterous fauna of Syria.—H. Wichmann, the minute anatomy of the seeds of *Aleurites triloba*, Forst. (two plates).—Dr. J. Csokor, on the pimple mite, and on a new variety of the same occurring in swine (*Demodex phylloides*), one plate.—H. Leder, contribution to the coleopterous fauna of the Caucasus.—S. Schulzer, mycological notes, iv.—E. Reitter, the synonymy of coleoptera; contributions to a knowledge of the European Pselaphidæ and Scydmanidæ: on new coleoptera from South-West Russia; on Spelæodytes, Mill.—Dr. H. Loew, analytical table to determine the North American species of Pachyrrhina, a genus of Tipulidæ.—C. R. Osten-Sacken, the Tanyderina, a remarkable group of the Tipulidæ.—F. von Thümen, two new leaf-frequenting ascomycetes, from Vienna.—A. von Pelzel, on a fifth package of birds from Ecuador; on Dr. Breitenstein's collection of beasts and birds from Borneo.—Dr. F. Löw, notes on Psyllodidæ (with a plate); descriptions of new gall-insects, with notes on some species already known.—Dr. R. Bergh, contributions to a monograph of the Polyceridæ (with six plates).—W. Voss, materials towards a knowledge of the fungi of Carniola.—Dr. G. Mayr, on the ichneumon-wasp of the genus *Telenomus*.

THE *Zeitschrift für wissenschaftliche Zoologie*, xxxiv. Band, Heft 1, March.—Dr. Ernst Nauck, on the masticatory apparatus of the Brachyura, with a plate and woodcuts.—Dr. Hubert Ludwig, on *Asthenosoma varium*, Grube; and on a new organ in the Cidaridæ, with two plates and woodcut. Describes three specimens from the Museum Godeffroy, one possibly a variety of *A. varium*, or possibly a new species, and describes five sac-like organs which lie, like the radial Y-shaped manubria (Gabelstücke), in the plane of the ambulacra. These he calls the coecal sacs (Blindsacke) of the masticatory apparatus. Each coecal sac consists of a thin membrane, stiff with calcareous spicules; right and left of each of these there lie two other blind appendages, but very much smaller; they were first detected in *Cidaris tribuloides*, but were also found in *C. metularia*, *Dorocidaris papillata*, and *Goniocidaris canaliculata*. A slight trace of their existence was found in *Diadema setosum*, but they were quite absent in the families Echinometridæ and Arbaciadæ.—Prof. Dr. P. Langerhans, on the worm fauna of Madeira; part 3, with three plates (to the end of the Nemerteans).—The same, on the Madeiran Appendicularia.—Dr. H. von Ihering, on *Graffilla muricicola*, a new parasitic Rhabdocellian, with a plate (found in the kidney of *Murex trunculus* and *M. brandaris*, both at Naples and Trieste).

THE *Revue des Sciences Naturelles*, 2e série, tome 1, No. 4, March 15.—Dr. A. Godron, on the axillary buds and branches in the Gramineæ.—L. Tillier, essay on the geographical distribution of marine fishes (conclusion).—S. Jourdain, on the morphology of the early stage of the generative organs of *Helix aspersa*, with a plate.—M. Leymerie, sketch of the Pyrenees of the department of Aude (in continuation), with a plate.—A. Sabatier, the law of the correlation of forms and intermediate types.—E. Dubrueil, catalogue of the land and fluviatile mollusca of the department of Herault (conclusion).—Review of recent French works on zoology by Messrs. Jourdain, Rouzard, and Dubrueil, and on botany and geology by M. Dubrueil.

Rivista Scientifico-Industriale, March 15.—Note on electricity and earthquakes, by Prof. De Bosis.—Researches on the diathermanous power of films of soapy water, by Prof. Marangone.

Archives des Sciences Physiques et Naturelles, March 15.—Swiss geological review for 1879 (continued), by M. Favre.—Enigmatic descriptions of natural groups, by M. de Candolle.—New observations on philippium, by M. Delafontaine.—On decipium and its principal compounds, by the same.—Earthquakes and their scientific study, by M. Heim.—On the density of chlorine at high temperatures, by M. Crafts.